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1	WHC-SD-WM-EV-078	ALL	0	242-A EVAPORATOR COOLING WATER SAMPLING AND ANALYSIS PLAN	3	1	1	1

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1	1	Cog./Proj. Eng. Mgr.	Joel Carl	4/8/92	R1-51	D. M. Nguyen	D M Nguyen	4/9/92		1	1
1	1	QA	[illegible]	4/13/92	S1-51	Information Release Admin.			R1-08	2	1
5		Safety									
1	1	J. E. Geary	[signature]	4/13/92	R1-43						
1	1	R. B. Wurz	[signature]	4/16/92	S5-14						

18.	19.	20.	21. DOE APPROVAL (if required)
Craig M Loll 4/8/92 Signature of EDT Originator Date	Joel Carl 4/8/92 Authorized Representative for Receiving Organization Date	Joel Carl 4/16/92 Cognizant/Project Engineer's Manager Date	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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[] Full Paper (Check only one suffix)	[] Technical Report	Existing ID Number (include revision, volume, etc.)
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[] Abstract	[] Manual	If previously cleared, list ID number
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Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature)	Date	INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP
C. M. Loll Craig M Loll	4/8/92	Stamp is required before release. Release is contingent upon resolution of mandatory comments.
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Craig M Loll

Signature

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7. Abstract

The source, volumes and controls for the contributors to the 242-A Evaporator cooling water effluent are described. The information is used to justify the sampling point and frequency for this stream. Sample collection methods, sample handling requirements, constituents for which the samples will be analyzed and the associated quantitation limits are specified in the plan.

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J. A. Eacker

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242-A EVAPORATOR COOLING WATER SAMPLING AND ANALYSIS PLAN

April 8, 1992

Tank Farms Environmental Engineering

TABLE OF CONTENTS

1.0 INTRODUCTION

This Sampling and Analysis Plan has been prepared for the 242-A Evaporator Cooling Water effluent stream as required by the May 21, 1991 proposed amendments to the Hanford Federal Facility Agreement and Consent Order, (Ecology et al. 1989), otherwise known as the Tri-Party Agreement. In addition, Washington Department Of Ecology (WDOE) Consent Order No. ED-91NM-177, For the Permitting of Liquid Effluent Discharges Under the Washington Administrative Code (WAC) 173-216, requires the submittal of SAP's for the permitting of effluent wastewater streams.

This SAP documents the methods and frequency of sampling and the requirements for laboratory analysis, in order to determine the constituents of the 242-A cooling water wastestream. It has been developed in accordance with the Liquid Effluent Sampling Quality Assurance Project Plan, WHC-SD-WM-QAPP-011, Rev. 1 (WHC, 1992). The QAPP is intended to ensure that procedures are implemented and that the sampling and analysis work is performed to the proper level of control in order to meet the data quality objectives which it describes. The SAP shall take precedence over the QAPP in the implementation of specific responsibilities and methods, if discrepancies should exist.

2.0 OBJECTIVES

Sampling and analysis of the 242-A Evaporator Cooling Water wastestream is based on the following objectives.

- Provide data on chemical and radiological constituents to calculate loading and rate of migration to support the impact assessment of continued discharge.
- Provide data for Best Available Treatment - Economically Achievable evaluations and liquid effluent treatment system design, if needed.
- Provide data to support dangerous waste designation for the liquid effluents, if needed.

All changes to the sampling and analysis plan after approval shall be considered a class III change per the Hanford Tri-Party Agreement.

3.0 SITE BACKGROUND

3.1 PROCESS OVERVIEW

The 242-A Evaporator is the primary waste concentrator for Hanford Site, low-level radioactive, hazardous wastes that are stored in underground double-shell tanks (DST). The 242-A Evaporator uses evaporative concentration to reduce the volume of wastes, thus reducing the number of tanks required for storage. The facility receives a mixed waste stream which it separates into two streams: the concentrated slurry, which contains essentially all of the radionuclides and inorganic constituents, and the process condensate which contains volatile organic materials, and a minimal amount of radionuclides.

3.2 STREAM CONTRIBUTORS

A total of ten contributors feed the 242-A Evaporator Cooling Water wastestream, in the following order of volume contribution to the stream.

1. Condenser cooling water (E-C-1, -2 and -3, approx. 2,650 gal/min)
2. Air compressor cooling water (10 gal/min)
3. Steam trap condensate (10 gal/min)
4. Emergency steam turbine cooling water (5 gal/min, intermittent)
5. Emergency steam turbine condensate (2 gal/min, intermittent)
6. HVAC air washers (less than 1 gal/min)
7. Water filter catch pan drainage (less than 10 gal/d)
8. HVAC room floor drains (less than 10 gal/d)
9. Steam system relief valve discharges (less than 10 gal/d)
10. Compressed air receiver condensate (less than 10 gal/d).

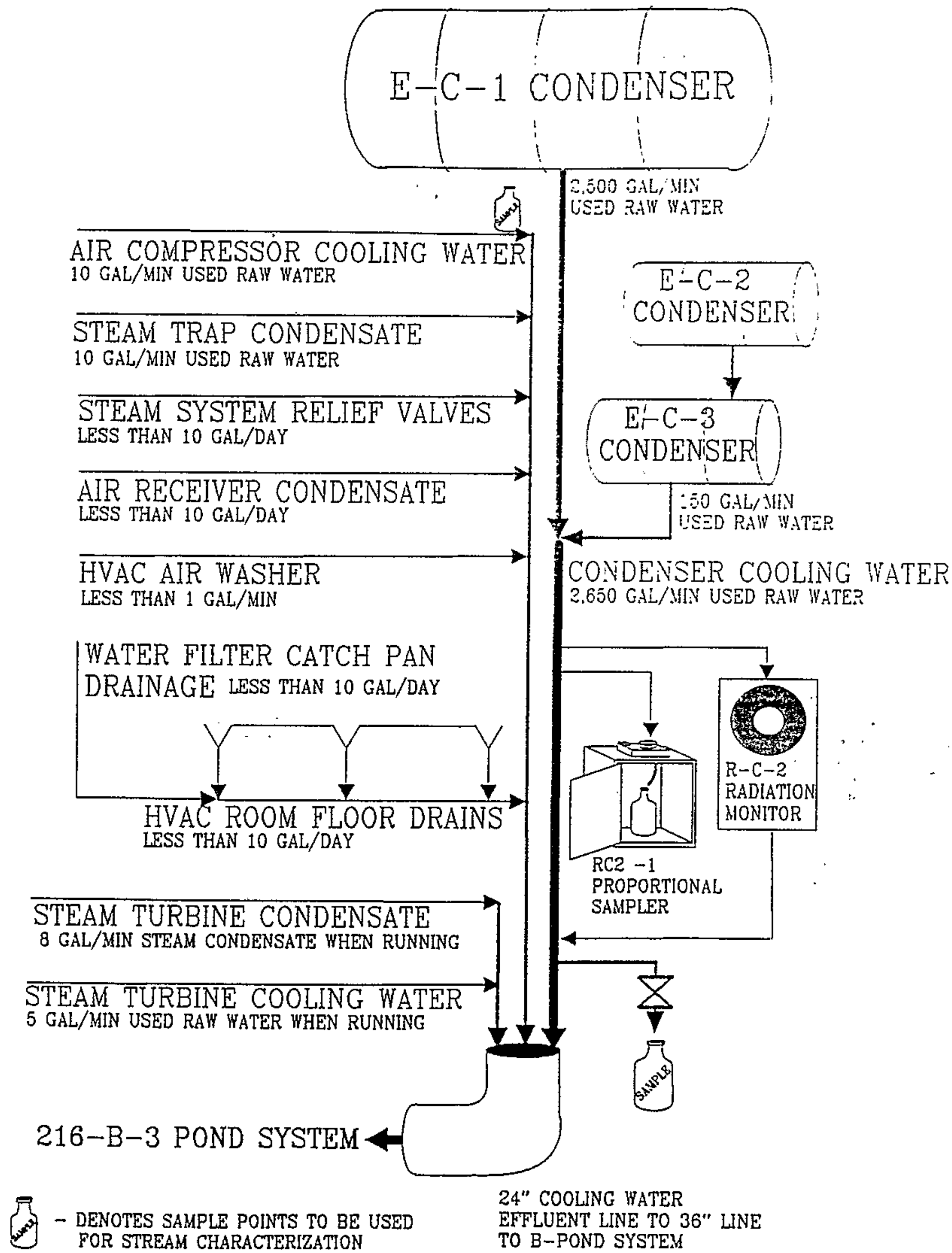
The compressed air dryer discharges which were discussed within the stream specific report (WHC, 1990), were discontinued. The steam heated air dryer was replaced by an electric dryer, eliminating steam condensate from this source, and the moisture removed from the air is now discharged back to the atmosphere rather than to the drain.

During evaporator processing operations, at least seven of the contributors are potentially adding liquid to the stream. During shutdown/maintenance the compressor cooling water is the only consistent contributor to the cooling water waste stream.

The contributing streams all consist of non-contact cooling water or steam condensate. The 242-A Evaporator process does not involve the intentional addition of hazardous constituents to the steam condensate stream or to any of its contributors. Waste Tank Facility Operations limits the use of hazardous materials within its facilities by the use of administrative controls, ie., procedures which govern the use of such materials in the workplace.

The configuration of the stream contributors are depicted in Figure 2-1.

Figure 2.1 COOLING WATER WASTESTREAM CONFIGURATION



ALL FLOWRATES ARE NOMINAL VALUES

3.2.1 CONDENSER COOLING WATER

The purpose of the condensers is to condense vapors which were removed from the 242-A feed stream by the vapor-liquid separation process. This is performed by passing the vapor from the separator through a series of three water cooled condensers, a series of deentrainers, and particle filters before the stream exits the facility. This process removes organic vapors and any radionuclide particulates which are part of the facility off-gas.

Vapors, from the vapor-liquid separator, enter the primary condenser for the first stage of cooling. The carbon steel primary condenser, roughly 17.5 ft long by 12 ft in diameter, consists of 2950, 3/4" outside diameter, equally spaced, carbon steel tubes. Raw cooling water flows through the tubes of the condenser while the vapors travel around them. Condensed vapors drain out of the condenser into the condensate collection tank, C-100.

Vapors leaving the primary condenser are routed to the inter- and after-condensers, in series. These two heat exchanger units use raw water which runs through the carbon steel tubes of inter-condenser first, and then the after-condenser. The process condensate from these condensers also drains to the C-100 collection tank. After passing through all three condensers, any remaining vapors pass through a series of deentrainers and particle filters before exiting the facility.

Raw water is supplied from the 200 East Area power plant to provide cooling to the three evaporator process condensers and other contributors. The primary condenser uses a nominal 2,500 gpm (3,500 gpm, maximum), while 150 gal/min flow through the inter- (E-C-1) and after- (E-C-1) condensers in series. The flow from the condensers comes together into a single cooling water line that is monitored for radiation level. The condenser cooling water system is a hard-piped, closed system. No chemicals are introduced into the water by this cooling process. The condenser system is designed so that any leaks which develop in the condensers, between the process stream and the cooling water, will be prevented from contaminating the cooling water. This is performed by keeping the cooling water line pressure higher than the pressure on the waste stream side. If a leak were to occur, cooling water would be forced into the waste stream, rather than the reverse.

An in-line radiation monitor (RC-2) and proportional sampler (RC2-1) are located downstream of the condensers. The used cooling water effluent from the condensers flows into a 24 inch diameter pipe where it is combined with the other eight contributors to the overall 242-A Evaporator cooling water stream. This combined effluent is then routed to the 216-B-3 Pond System.

3.2.2 AIR COMPRESSOR COOLING WATER

Process and instrument air are used to operate valves, samplers, and weight-factor instruments. Process air is used wherever possible, however, for instruments which are sensitive to moisture, instrument air is used. A supply of compressed air is essential for proper operation of the 242-A facilitThere are two air compressors installed in the 242-A Evaporator building

that supply compressed instrument and process air to the facility. These compressors are designed to deliver 100 scfm of air at 100 psig. During normal operation one of the compressors is on-line and the other acts as the backup. The failure of one compressor will cause the backup to automatically kick on. The compressors automatically cycle so that the run time is split between them, but one compressor is usually running, keeping the air receiver, and the air lines at a specific pressure.

Each compressor is cooled with a water jacket, which requires a single pass of cooling water to keep the equipment at the proper operating temperature. The cooling water flow is controlled by a solenoid valve which only delivers cooling water to a compressor when it is operating. There is also a temperature sensor on the cooling water, which will activate an interlock, shutting down the compressor and the cooling water if the temperature is too high. The source of the cooling water is raw water from the Columbia River that is supplied from the 200 East Area Powerhouse. The compressor cooling water is hard piped from the supply to the drain. The drain line from the compressors dumps into a 4" drain line along with several intermittent contributors, including the drain line from the HVAC room. The 4" line drains directly into the 24" cooling water line which leads out to B Pond. The compressor cooling water discharge is an estimated 10 gpm based on design. Cooling water is only supplied to the compressor that is running, but the cooling water discharge is constant since one of the compressors is running, delivering air to the air receiver tank.

Other contributors to the 4" drain which the compressor cooling water empties into, include blowdown from the separator and the air receiver. The source of the water in the blowdown is water vapor from the air that condenses as the air is compressed, changing the vapor saturation level. The condensate from these pieces of equipment drains via an air trap to the 4" drain line. Flow contributions from these sources are intermittent and small (estimated <10 gpd) when they occur. The air receiver is discussed more in depth in Section 3.2.4.

The air compressor discharges consist of wastewater that is not in proximity to any waste or hazardous materials. An accessible sample point exists where the compressor cooling water lines empty into a 4" drain line with the smaller contributors mentioned above.

3.2.3 COMPRESSED AIR DRYER DISCHARGES (No longer discharging)

Instrument air is required for instruments which are sensitive to moisture. A 1 1/2" line from the process air manifold provides the instrument air. As part of the latest upgrades to the 242-A facility, a 460-volt, 60 cycle, 3-phase air dryer has replaced the steam heated air dryer which had previously been in place. The air dryer removes the moisture from the air using activated alumina absorbent. It has two columns which cycle automatically. One column removes moisture, while the other is being regenerated (dried).

The heating coils which are now used to remove the moisture from the columns, are electric, rather than steam heated. The steam heated coils used to discharged a small amount of steam condensate. The elimination of steam heating has eliminated this discharge. In addition, the previous air dryer collected and discharged the moisture removed from the air, into the cooling water wastestream. The new air dryer blows the moisture back into the atmosphere, as a vapor, eliminating another contribution to the cooling water wastestream.

3.2.4 COMPRESSED AIR RECEIVER CONDENSATE

The air receiver or air storage tank is a steel upright tank with a volume of 125 cubic feet. The tank has a pressure relief valve set at 125 psig, a pressure gage, a moisture trap, and a drain valve. After instrument air leaves the aftercooler (with moisture separator), it enters the receiver tank. Any moisture which remains in the air after the drying process, collects in the moisture trap and is periodically drained. The contribution of this condensate to the cooling water line is less than 10 gallon per day. The air condensate contributes no hazardous waste to the line.

3.2.5 EMERGENCY STEAM TURBINE CONDENSATE AND COOLING WATER

Following the loss of the normal HVAC system, steam drives an emergency turbine that maintains safe ventilation (and pressure differentials) in the various facility zones. The steam turbine is activated whenever there is a power outage at the building and during any maintenance to the primary fans. The steam is supplied from the 200 East Area Powerhouse and the drain is hard piped to the main drain line. The condensate is not in proximity to any waste processing or chemical handling. There is no path for introduction of hazardous constituents. The design maximum discharge due to steam condensate is 8 gpm. The real discharge is more like 1 gpm and it is basically independent of the turbine operation. A weekly functional test (less than 1 hr of run time) is performed on the steam turbine, and it also comes on during activities such as maintenance being performed on the main fans. The total average flow rate of steam condensate from the turbine, is still estimated at less than 1 gpm.

EMERGENCY STEAM TURBINE CONDENSATE AND COOLING WATER (cont'd)

In addition to the steam condensate, there is a small contribution of cooling water from the emergency steam turbine. Lubricant oil is used to cool and lube the bearings in the turbine. The lube oil is pumped through a closed loop cooling system. It is cooled in a jacketed heat exchanger where one-pass cooling water, flowing at about 5 gal/min, removes the heat from the oil. This cooling water then flows into the same collection tank that the steam condensate from the turbine collects in, and from this point the combined stream drains to the 24" cooling water line which empties into the 216-B-3 Ditch. The cooling water stream is controlled by a solenoid valve which only opens when the steam turbine is in operation. This cooling water stream does not come in direct contact with any hazardous chemicals.

3.2.6 HVAC AIR WASHERS

The incoming air for the building ventilation is cooled by raw water. The air flows through a vessel containing a series of baffles while raw water is sprayed into the vessel and gravity drains down, over the baffles. Heat is absorbed by the cooler, raw water, and it drains to a small reservoir where it collects and is pumped back to the top of the washer. The reservoir is kept full by the addition of more raw water. An overflow from the reservoir is hardpiped to a 10" drain funnel in the AMU room, the same one that the compressor cooling water discharges to. The air washer system is a closed system which does not use any hazardous chemicals and is not susceptible to spills of such materials.

3.2.7 WATER FILTER CATCH PAN DRAINAGE

Raw water for the process vent system deentrainment pads and de-superheater is strained and filtered in the heating, ventilation, and air conditioning (HVAC) room. The HVAC room is located on the second floor of the 242-A building. It houses the ventilation intake fans for the entire building. Steam lines for the building heating, the raw water main for the building, and some fire protection lines, all run through the HVAC room. Runoff from two filters and two strainers is collected in a catch pan with a drain in the bottom, set on the floor of the HVAC room. The catch pans collect raw water and oversized particles from the raw water filters. Runoff only occurs during routine maintenance such as a filter change or backwashing the strainers when flow is switched from one to the other. There are no chemicals or hazardous materials stored or regularly used in the HVAC room and no chemicals are purposely introduced to the stream at this point. The wastewater from the catchpans should be unchanged from the raw water source it came from.

3.2.8 HEATING, VENTILATION, AIR CONDITIONING ROOM FLOOR DRAINS

Three floor drains exist in the HVAC room. Leaks or the runoff from maintenance work on the water or steam systems would flow to the floor drains. Contributions to the 242-A Evaporator Cooling Water wastestream from these floor drains is periodic in nature. The steam and water systems present in the HVAC room are uncontaminated. There are no chemicals or hazardous materials stored in, or regularly used in the HVAC room, nor does floor drain runoff have an opportunity to come in contact with such materials. The contribution from this stream is estimated at less than 10 gal/day, however, this is not a routine contributor and the flowrate is not measurable.

3.2.9 STEAM TRAP CONDENSATE AND STEAM SYSTEM RELIEF VALVE DISCHARGES

Steam is used in the HVAC system to heat incoming air for the building heating. During non-operational mode the demand for HVAC steam is seasonal. During waste processing, incoming air is heated to keep the evaporator room warm (around 100 °F). Several steam traps, required for the removal of steam condensate from the steam lines, are located within the HVAC room. These steam-traps are automatically actuated by a buildup of condensate within them, and they empty into the HVAC room drain lines. While waste processing is occurring, these steam traps produce around 10 gpm of non-hazardous steam condensate, which contributes to the cooling water stream.

There are also several relief valves associated with the steam system which are located in the HVAC room. If the HVAC system steam pressure exceeds the pressure setting on the relief valves, they vent steam to the drain funnel. There are no hazardous materials introduced, or accessible to the steam system at this point. The contribution of steam relief discharges to the cooling water wastestream is less than 10 gal/day.

3.3 RECEIVING SITE

The 216-B-3 Pond System consists of a series of four earthen, unlined, interconnected ponds and the 216-B-3-3 Ditch. This network of ditches and ponds receives miscellaneous wastewater effluents from several of processing facilities on the Hanford Site, including the 242-A Evaporator Facility.

All of the wastewater effluents being discharged to the B Pond System travel through the 216-B-3-3 Ditch. The 242-A cooling water wastestream is hardpiped to the head end of the 216-B-3-3 Ditch, where it is discharged to the ditch, along with the other streams from the various facilities. This ditch is approximately 3,700 feet long, 30 ft wide at ground level, 6 ft wide at the bottom, and 6 to 12 ft deep.

Water discharged to the 216-B-3-3 Ditch flows directly into the 216-B-3 Pond System. The first pond, or lobe, is the 216-B-3 Pond. It was placed into service in 1945, and covers a surface area of approximately 35 acres, anywhere from 2 to 20 ft deep. Overflow from this first lobe runs into the

RECEIVING SITE (cont'd)

second lobe, 3A. This lobe covers approximately 11 acres and is about 2.0 ft deep. Overflow from 3A runs into the 3C Pond, which has a designed surface area of 41 acres. This lobe has eight, parallel trenches, approximately 8 to 14 ft wide and 4 ft deep, cut into the bottom of it to increase percolation into the soil. At the present time, water covers about 1/3 of the trench area within the lobe.

Flow between the ponds is via galvanized, corrugated, steel pipes, and is controlled by downward-opening slide gates. A network of groundwater monitoring wells has been established around the B Pond System to measure water levels, obtain groundwater samples, and evaluate aquifer properties. Liquid levels within the ponds are measured with staff gages, and the flowrate in the 216-B-3-3 Ditch is measured with a flume and flowmeter and recorded on a stripchart. The pond liquid levels, gate settings, and cumulative flowmeter readings are recorded daily. When the 242-A Evaporator Facility is processing waste, the cooling water waste stream is the largest wastewater contributor to the 216-B-3 Pond System.

4.0 RESPONSIBILITIES

Sampling will be performed by Sampling and Mobile Laboratory Team personnel which are trained in RCRA protocol sampling. This includes sample security, preservation and transportation. They will maintain a field logbook, entering pertinent information. All sampling will meet the quality assurance requirements of SW-846 (EPA 1986).

The manager of Tank Farm Environmental Engineering (TFEE), will designate an engineer as sampling task leader who will be responsible for field sampling activities. Responsibilities include scheduling the sampling according to the frequency established in this document, ensuring that the appropriate equipment is used for sampling, and that all field sampling work is done according to established procedures.

Tank Farms Waste Treatment Engineering will be responsible for designating the dates for sampling activities to take place.

Effluent Treatment Programs, or designee, will select a laboratory to perform analysis of samples taken under the Hanford liquid effluent program. They will verify that this laboratory meets the criteria of this Sampling and Analysis Plan and the Liquid Effluent Sampling Quality Assurance Project Plan (QAPP) (WHC 1991), and will monitor the contract laboratory for quality

RESPONSIBILITIES (cont'd)

performance. Effluent Treatment Programs, or designee, will act as the interface between the Sampling and Mobile Labs Group, and the selected laboratory, coordinating sample shipment.

Data from the analyses will be validated by the OSM or a qualified contractor. Validation will be performed as described in the QAPP (WHC 1991).

Tank Farm Environmental Engineering (TFEE) is responsible for preparation, maintenance and implementation of this plan. Any changes required by changes to the process, sampling method or parameters to be analyzed will be initiated by TFEE. TFEE will receive the validated data package and ensure that the data is filed with the Environmental Data Management Center (EDMC). TFEE is responsible to evaluate the data for any significant changes from previous sampling activities or expected results.

5.0 SAMPLING LOCATION AND FREQUENCY

5.1 LOCATION

Samples for characterization of this effluent wastestream, will be drawn from two locations. Sampling of the condenser cooling water will be performed at a 1/2" sample port downstream from the intake for the RC2-1 radiation monitor and the R-C-2 proportional sampler, located in the condenser room. Sampling of the compressor cooling water will be performed at the point where the cooling water discharges to a funnel floor drain in the AMU room.

The sampling points above have been chosen for several reasons. The two streams which are to be sampled are the only consistent contributors to the cooling water wastestream. If there were no contributions from these two streams there would be no measurable flow for this effluent wastestream. The discharges from the other contributors are intermittent, and even when they are discharging, they are negligible in terms of measurable flow.

There are no accessible locations to draw samples from the other contributors, barring cutting into the pipes. They are hardpiped to the 24" discharge line, which runs beneath the facility. There is no point at which end-of-the pipe samples can be taken, either. The combined cooling water wastestream joins the effluent from another facility before discharging to the 216-B Pond System. For these reasons the two sampling locations which have been chosen are the most feasible points for providing representative composition data which meets the objectives stated in Section 1.0.

LOCATION (cont'd)

In addition to the effluent sampling locations, sampling will be performed on the raw water feed to the 242-A Facility. This sampling will be performed in the water services building (242-A-81), which is located directly south of the 242-A building about 30 ft. The samples will be drawn from a hose connection which stems off the main raw water line which services the 242-A Facility.

5.2 FREQUENCY

There will be four samples taken at each sampling point (R-C-2 sampler, compressor water discharge, raw water intake) to provide a baseline characterization. The condenser cooling water samples will be taken during the 242-A Evaporator start-up campaign, expected to occur in late 1992. The first sample shall be taken in the first week of evaporator operation. The only requirement for the second and third samples are that they be taken more than one day apart. The fourth sample shall be taken sometime within the last two weeks of planned operation. The specific day and time for sampling will be based on the start-up schedule and determined by Waste Treatment Engineering.

The first two compressor cooling water samples will be taken during maintenance/shutdown at the evaporator, and will be coordinated with other sampling events at Tank Farm facilities. The second two samples will be taken during evaporator operation and will be coordinated with two of the four condenser cooling water sampling activities.

The raw water samples may be coordinated with other Tank Farm facility sampling events and may be taken during maintenance/shutdown or the waste processing campaign.

A protocol sample of the 242-A Evaporator compressor cooling water and the condenser cooling water (provided it is running) will be taken once each year thereafter, provided the baseline doesn't suggest otherwise. If there is a major change in stream configuration, such as elimination of one of the major contributors, two samples will be taken to assess any changes to the overall stream.

6.0 SAMPLING EQUIPMENT AND PROCEDURES

Sampling of the condenser cooling water discharge will be performed by obtaining grab samples from the 1/2" sample port in the 242-A condenser room. Sampling of the compressor cooling water discharges will also be performed by grab sample, in the AMU room, where the compressor cooling water lines discharge directly to a floor drain funnel. Specific protocol sampling procedures are being developed by TFEE and S&ML and will be approved prior to sample taking. The characteristics of the cooling water waste stream are not expected to vary over time. One-time samples have been chosen as

SAMPLING EQUIPMENT AND PROCEDURES (cont'd)

the prefered method over composite samples. The sampling will be performed by Sampling and Mobile Laboratory Team personnel. They are trained in the requirements of RCRA protocol sampling techniques, labeling and documentation, and all sampling protocols will be observed.

Preventative maintenance (PM) is not required on any of the equipment pertinent to the sampling activities described in this plan. Refer to QAPP (WHC, 1991), Section 14.0, for corrective actions.

Field measurements will be made for conductivity and pH at the time of sampling. The results of the field measurements are entered into the sampling logbook.

Field blanks will be used as part of the QA/QC program. For the first sampling activity a volatile organic analysis (VOA) and semi-VOA field blank will be prepared. Continuation of the semi-VOA field blank will depend on the results of the sampling. VOA field blanks will be prepared for each sampling activity. The bottles will be preserved as specified for these analyses. Each bottle will be opened in the field and filled with pure reagent water. The blanks will then accompany the samples for transport, handling and analysis.

In addition to a field blank a VOA trip blank will be prepared during each sampling activity. The bottle will be preserved as specified for these analyses. Each bottle will be filled and sealed then accompany the batch of containers to the sampling site. The blank will remain unopened in the field and return with the sample containers to the lab.

Duplicate samples will be taken from one stream during the first operation sampling event. The duplicate will be taken for VOA, semi-VOA, and ICP metal analysis. The duplicate samples will be taken by the same method and handled in the same fashion. Additional duplicate sampling will be determined based on the results of the first two batches.

Sample bottles shall be new commercially available certified precleaned glass or plastic bottles. The sample volumes and number of containers are prescribed by the analytical laboratory and are subject to change. Tentative requirements for container size, type, and preservative are:

- o 125 ml plastic container(s) with teflon[2] lined cap for anions and pH
- o 250 ml plastic container(s) with teflon lined cap, pH<2 by nitric acid preservative for Inductive Coupled Plasma Metals.

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[2] Teflon is a trademark of the DuPont de Nemours & Co.

SAMPLING EQUIPMENT AND PROCEDURES (cont'd)

- 250 ml plastic container(s) with teflon lined cap, pH<2 by nitric acid preservative for Atomic Absorption Metals.
- 500 ml plastic container(s) with teflon lined cap, pH<2 by nitric acid preservative for mercury.
- 100 ml plastic container(s) with teflon lined cap, pH<2 by sulfuric or HCl for TOC.
- 250 ml glass container with teflon lined cap for COD
- 40 ml amber glass container(s) with septum cap (teflon lined), for Volatile Organics, ; The volatiles will be taken in duplicate.
- 1 liter amber glass container(s) with teflon lined cap for Semi-volatile organics.
- 250 ml glass container(s) with teflon lined cap for TOX
- 1 liter amber glass container(s) with teflon lined cap for pesticides.
- 1 liter amber glass container(s) with teflon lined cap for herbicides.
- 1 liter plastic container(s) with teflon lined cap, preserved with 2 ml of 6 Molar NaOH for cyanide/sulfur reactivity.
- 1 liter glass container(s) with teflon lined cap for phenols
- 1 liter glass container(s) with teflon lined cap for dioxins and furans
- 500 ml plastic container(s) with teflon lined cap for TDS, TSS and alkalinity
- 250 ml glass container(s) with teflon lined cap for turbidity and conductivity
- 120 ml plastic container(s) with teflon lined cap for coliform
- 1 liter plastic container with teflon lined cap preserved with 2 ml nitric acid, for gross alpha, beta and radiochemicals.

Containers for VOA, TOC, and TOX samples shall be filled without bubble formation and without leaving a head space.

SAMPLING EQUIPMENT AND PROCEDURES (cont'd)

Each sample or sample preparation shall be labeled with the assigned sample number or a unique laboratory number. Labels shall be filled out and affixed to the containers at the time of sampling. The labels shall include at least the following information:

- sample identification number
- person collecting the sample
- date and time of sample collection
- place of sample collection
- any pertinent field information

A unique sample identification number shall be used for each sample. Sample numbers will be obtained from the Hanford Environmental Information System (HEIS) or an equivalent database.

The samples shall be cleaned and radiologically surveyed for offsite release. The released sample containers shall then be bagged and re-bagged. The samples will be placed in a cooler containing ice. The cooler shall become part of the sample packaging and have tamper evident tape placed over its opening.

A logbook shall be maintained which contains information pertinent to the sampling. Entries are to contain the sample point, sample number, container volumes, date and time of collection, field measurements, any field observations, transportation information, and signatures of personnel responsible for observations. The Sampling and Mobile Laboratories group will control and maintain the logbooks.

Until a liquid effluent database accessible to the regulatory agencies is developed, sample data will be sent to the EDMC, and the agencies will be notified accordingly. The data will be part of the administrative record for the associated Tri-Party agreement milestone.

7.0 SAMPLE HANDLING AND ANALYSIS

All samples will be handled and transported to the laboratory in a manner to ensure that the integrity of the samples will be protected. All sample handling documentation will be confirmed by the Sampling and Mobile Lab. Packaging and shipping requirements are specified in Section E II 5.1, of the Environmental Investigations and Site Characterization Manual (WHC 1989).

Traceability of samples obtained during the sampling activity will be controlled as specified in QAPP (WHC 1991). A chain-of-custody form will be filled out for the samples at the time of sampling and will accompany each sample. A sample may consist of several containers. The chain-of-custody

SAMPLE HANDLING AND ANALYSIS (cont'd)

will account for each container. Once a sample has been drawn it must be in the physical control or view of the custodian, locked in an area where it can not be tampered with, or prepared for shipping with tamper-proof tape applied. Physical control includes being in the sight of the custodian, being in a room which will signal an alarm when entered, or locked in a cabinet. When more than one person is involved in sampling, one person shall be designated and only that person signs as sampler. This person is the custodian until the samples are transferred to another location or group and shall sign when releasing the samples to the designated receiver.

The approved laboratory shall designate a sample custodian and a designated alternate responsible for receiving all samples. The sample custodian or his alternate shall sign and date all appropriate receiving documents at the time of receipt and at the same time initiate an internal chain-of-custody form using documented procedures.

Analytical procedures for protocol samples shall meet the quality assurance requirements of SW-846 and of the Liquid Effluent Sampling QAPP (WHC 1991). Holding times requirements shall meet those of SW-846. The Statement Of Work (SOW) for completing the analysis shall define the approval mechanism that the contract administrator will use in order to control the approval of analytical procedures, how they are maintained and changed. The SOW shall also require the approved laboratory to submit any changes in their procedures during the contract term to the contract administrator for approval. The approved laboratory procedures shall describe data reduction, verification, and reporting.

The constituents to be analyzed are listed in Table 1. The analyte list is based on 40 CFR 264, Appendix IX (EPA 1991), and the QAPP, Table A-1 (WHC 1991). Additional analyses have been added, based on permitting requirements. Quality assurance objectives including the analytical method, precision, accuracy, and completeness, unless otherwise stated, shall be as detailed in the QAPP (WHC 1991). These criteria may be adjusted by agreement with the proposed laboratory prior to final approval of the contract or work order.

TABLE 1

SAMPLE ANALYTE LIST

INORGANICS

Antimony	Calcium	Mercury	Silver
Aluminum	Chromium	Manganese	Sodium
Arsenic	Cobalt	Magnesium	Thallium
Barium	Copper	Mercury	Tin
Beryllium	Iron	Nickel	Vanadium
Cadmium	Lead	Potassium	Zinc
		Selenium	

IONS/ANIONS

Fluoride	Sulfite	NH_3 ion
Chloride	Nitrate	Sulfide
Sulfate	Nitrite	Cyanide

ORGANICS

VOA	(all 8240 analytes)
Semi-VOA	(all 8270 analytes)
Pesticides/PCB's	(all 8140 and 8080 analytes)
Herbicides	(all 8150 analytes)
Total Organic Carbon (TOC)	
Total Oil & Grease	

DIOXINS/FURANS

(all 8280 analytes)

RADIOCHEMICAL

Alpha	Pu241	Ru106
Beta	Cs137	Sr90

OTHER

pH	Total Dissolved Solids (TDS)	Ammonia
Conductivity	Total Suspended Solids (TSS)	TKN
Total Coliform	Biological Oxygen Demand (BOD)	ethylene glycol
Turbidity	Chemical Oxygen Demand (COD)	Phosphate
Alkalinity	Total Oxygenated Halides (TOX)	

REFERENCES

Ecology, EPA, and DOE, 1989, Hanford Federal Facility Agreement and Consent Order, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

EPA, 1986, Test Methods for Evaluating Solid Wastes, SW-846, 3rd edition, U.S. Environmental Protection Agency/Office of Solid Waste, Washington D. C.

WHC, 1989, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, Section 5.11, Westinghouse Hanford Co., Richland, Washington.

WHC, 1990, Hanford Site Stream-Specific Reports, WHC-EP-0342, Addendum 21, Westinghouse Hanford Co., Richland, Washington.

WHC, 1991, Liquid Effluent Sampling Quality Assurance Project Plan, WHC-SD-WM-QAPP-011, Rev. 1, Westinghouse Hanford Co., Richland, Washington.